

APRIL/MAY 2024

**23USC21/23UCS21 — DATA STRUCTURE  
AND ALGORITHM**

Time : Three hours

Maximum : 75 marks



**SECTION A — (10 × 2 = 20 marks)**

Answer ALL questions.

1. What is linear linked list?
2. Given an one-dimensional integer array  $a[100]$  with initial address 2020. Find the address of its tenth position.
3. Convert the given infix to postfix.  $(j * k) + (x + y)$ .
4. List the Applications of queue.
5. What are the two methods of binary tree implementation?
6. Define binary search tree.
7. What is a directed graph?
8. Define indegree and out degree of a graph.
9. What is meant by Sorting?
10. List the types hash function.



SECTION B — ( $5 \times 5 = 25$  marks)

Answer ALL questions.

11. (a) How polynomial expression can be represented using linked list?

Or

- (b) Define the deletion operation from a linked list.

12. (a) Write the algorithm for converting infix expression to postfix (polish) expression.

Or

- (b) Write a function called 'push' that takes two parameters: an integer variable and a stack into which it would push this element and returns a 1 or a 0 to show success of addition or failure.

13. (a) Explain about B-Tree with suitable example.

Or

- (b) Explain the tree traversal techniques with an example.

14. (a) Explain the various representation of graph with example in detail?

Or

- (b) Explain Breadth First Search algorithm with example.

15. (a) Write an algorithm to implement Bubble sort with suitable example.

Or

- (b) Explain Re-hashing and Extendible hashing.

SECTION C — ( $3 \times 10 = 30$  marks)

Answer any THREE questions.

16. Explain the insertion operation in linked list. How nodes are inserted after a specified node.
17. Discuss in detail about the operations on queues with example.
18. How to insert and delete an element into a binary search tree and write down the code for the insertion routine with an example.
19. Explain the various applications of Graphs.
20. Write an algorithm for binary search with suitable example.